

REMARKS

Upon entry of the Amendment, Claims 1-13, 15-17, 51, and 213-218 will be pending in the application.

Claim 14 was previously canceled, and nonelected Claims 18-50 and 52-212 are canceled herein without prejudice to the filing of a divisional application directed to these claims as well as for subsequent rejoinder or resubmission of these claims when a generic claim directed to these species is allowed.

Claims 1 and 51 are amended to delete the phrase “including no carbon therein”. Previously, Claims 1 and 51 were amended to recite “including no carbon therein” in the Amendment filed on March 2, 2005. Such phrase was not in the original claims.

New Claims 215-218 are added. Support can be found, for example, in Claims 1, 8 and 15-17.

Entry of the amendment along with reconsideration and review of the claims on the merits are respectfully requested.

Formal Matters

Applicants have previously elected Claims 1-17 and 51 (Species I, represented in figures 5A-8C, where Claim 1 is generic, directed to a one-layer single-damascene structure), and the Examiner has withdrawn from consideration Claims 18-50 and 52-212.

The Examiner has acknowledged the claims for foreign priority and the receipt of the priority documents in related Application No. 10/281,321. However, Applicants are still not sure if the Examiner is acknowledging the receipt of only two, or all three, priority documents.

Thus, as a measure of caution, Applicants respectfully request that the Examiner confirm receipt of, or check the records again for receipt of, all three foreign priority documents. As a summary, the foreign priority document filed on October 17, 2002, was filed in the parent application Ser. No. 10/281,321, now abandoned. The foreign priority document filed on May 5, 2003, was filed in the present application on August 28, 2003. The third foreign priority document based on a Japanese application filed on May 8, 2002, should be acknowledged since priority was claimed, and it was filed, in the parent application Ser. No. 10/281,321, now abandoned.

Applicants appreciate that the Examiner has accepted the drawings filed on March 2, 2005, and returned an initialed PTO/SB/08 based on the Information Disclosure Statement filed on March 2, 2005.

Allowable Subject Matter

Applicants appreciate the Examiner's indication that Claims 8 and 15-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response, Applicants add new Claims 215-218 directed to each of Claims 8 and 15-17 rewritten in independent form, as viewed in the Amendment to the Claims.

Accordingly, Applicants respectfully request allowance of at least Claims 215-218, and submit that the remaining pending claims are patentable for the following reasons.

Statement of Summary of Examiner's Interview

Applicants' representative called the Examiner on September 19, 2005, to discuss maintained objections to the title and disclosure and maintained rejections under 35 U.S.C. §112, when no additional comments were provided by the Examiner in maintaining the objections/rejections. Applicants' representative indicated that, other than the objection to the title, the previous Amendment under 37 C.F.R. § 1.111 filed on March 2, 2005, fully responded to the Examiner's objections/rejections.

Regarding the objections, Applicants' representative explained that the objection to the title was self-explanatory and that Applicants would consider amending the title as suggested by the Examiner. However, regarding the objection to the disclosure because Applicants' CIP related information should assertedly be updated, Applicants' representative pointed out that the previous Amendment under 37 C.F.R. § 1.111 filed on March 2, 2005, amended the first sentence of the specification to indicate that the CIP is "now abandoned". The Examiner indicated that the objection could have been maintained in case the related application information might have changed since the previous Amendment. Since the related application information has not changed, Applicants' representative indicated that no further amendment to the disclosure of related applications was believed to be necessary.

Regarding the rejections under 35 U.S.C. § 112, second paragraph, Applicants' representative discussed the Examiner's position regarding the rejection of Claims 3-7, 12 and 51. The Examiner maintains that "silicon dioxide" is discussed in the specification for the elected species such that the subject matter of Claim 3 reciting "said low-k material layer comprises one of a ladder-type hydrogen siloxane layer and a porous ladder-type hydrogen siloxane layer" is assertedly not part of the elected species. Applicants' representative indicated that he did not think that the elected species was limited to an embodiment with silicon dioxide as the first insulating interlayer, but that he would look at the specification again for disclosure regarding the scope of the elected species.

Applicants' representative discussed the Examiner's position regarding the rejection of Claims 12 and 51 regarding what is meant by "wherein said first silicon-diffused metal layer includes no metal silicide". Applicants' representative pointed out and explained that the previous Amendment under 37 C.F.R. § 1.111 filed March 2, 2005, amended Claims 12 and 51 to insert "formed thereon" to clarify that no metal silicide (or copper silicide) layer is formed on the silicon-diffused metal layer. Thus, Applicants' representative requested the Examiner reconsider his position in maintaining this rejection.

No agreement was reached during the Examiner's Interview. Applicants' respectfully request the Examiner's consideration of the above description of the Examiner's Interview along with the following remarks in traversing the objections and rejections of record.

Objections

A. The Examiner asserts that the title of the invention is not descriptive, and states that a new title is required that is clearly indicative of the invention to which the claims are directed. The Examiner suggests that the phrase “an its manufacturing method” should be deleted.

In response, Applicants clarify the title to recite, “SINGLE DAMASCENE STRUCTURE SEMICONDUCTOR DEVICE HAVING SILICON-DIFFUSED METAL WIRING LAYER ~~AND ITS MANUFACTURING METHOD~~”. Entry of the Amendment is respectfully requested.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to the title.

B. The Examiner objects to the disclosure because Applicants' CIP related application information should be updated, and requires appropriate correction.

In response, Applicants point out the previous amendment to the first sentence of the specification to recite “This is a Continuation-In-Part of Application No. 10/281,321 filed October 28, 2002, now abandoned; the disclosure of which is incorporated herein by reference.”

Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to the disclosure.

Claim Rejections - 35 U.S.C. § 112

Claims 3-7, 12 and 51 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

A. The Examiner asserts that in claim 3 it is unclear and confusing to what is meant and what shows "said low-k material layer comprises one of a ladder-type hydrogen siloxane layer and a porous ladder-type hydrogen siloxane layer." The Examiner asks, for the elected species, where is this low-k material layers discussed in the specification as they relate to the elected species of figures 5A-8C? The Examiner believes that silicon dioxide is discussed for the elected species.

In response, Applicants submit that Claim 3 falls with the elected species of Figures 5A-8C, and that Claim 3 is clear in reciting a preferred embodiment to the first insulating interlayer recited in Claim 1. Applicants point the Examiner to disclosure in the specification, for example, at pages 43-46 (in particular, page 43, lines 25-33; page 44, lines 1-4; and page 46, lines 10-13), which support the subject matter of Claim 3 being an embodiment encompassed within the scope of disclosure of Figures 5A-8C. At an earlier point, the specification states that "the insulating interlayer 110 can be made of a low-k material having a lower dielectric constant than that of silicon dioxide." (page 19, lines 5-8). Thus, Applicants submit that both Claims 1 and 3 are within the elected species and should be considered on the merits.

B. The Examiner also asserts that in claims 12 and 51 it is unclear and confusing as to what is meant by "wherein said first silicon-diffused metal layer includes no metal silicide." The Examiner asks how is there no metal silicide in a layer that comprises silicon and a metal, and how does this relate to the elected species of figures 5A-8C?

In response, Applicants point the Examiner to disclosure in the specification, for example, at pages 16-26 (in particular, Fig. 8A and page 19, line 31 to page 20, line 9), which

discuss the absence of metal silicide (specifically Cu silicide) *on* the silicon-diffused metal layer and the benefits thereof. Applicants point out that Claims 12 and 51 were previously amended to clarify that “no metal silicide [is] formed thereon” and “no copper silicide [is] formed thereon”, respectively. Thus, Applicants submit that Claims 12 and 51 satisfy the requirements of 35 U.S.C. § 112, second paragraph.

Accordingly, Applicants respectfully reconsideration and withdrawal of the rejections under 35 U.S.C. § 112, second paragraph.

Claim Rejections - 35 U.S.C. § 102

Although the Examiner cites to passages from 35 U.S.C. § 102(e) and 35 U.S.C. § 103(a), it appears that the Examiner expresses two prior art rejections in the present Office Action, both under 35 U.S.C. § 102(b), described below. Applicants kindly request confirmation of the two rejections under 35 U.S.C. § 102(b), or request a new non-final Office Action if other rejections were intended, but not expressed in the previous Office Action.

A. Claims 1-2, 9-13, and 213-214, insofar as the Examiner understands them, are rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by the IDS cited Literature 1 as a rejection by the Korean Office action (Korean Unexamined Patent Application Publication #1998-84723) (hereinafter “KP ‘723”) for the reasons of record.

B. Claims 1-13, 15-17 and 213-214, insofar as the Examiner understands them, are rejected under 35 U.S.C. § 102(b) as assertedly being anticipated by the IDS cited Literature 2 as

a rejection by the Korean Office action (Korean Unexamined Patent Application Publication # 1999-5857) (hereinafter “KP ‘857”) for the reasons of record.

Applicants respectfully traverse the rejections.

Applicants originally filed KP ‘723 and KP ‘857 in an IDS on March 2, 2005. Applicants filed the Korean language versions of each of these applications and an English translation of a portion of the Korean Patent Office’s remarks. Thus, Applicants presume that the Examiner is relying on only the English translation of the Korean Patent Office’s remarks as the basis for these anticipation rejections, along with the figures contained in the Korean applications, and Applicants proceed with their remarks for traversal based on this understanding. However, if the Examiner has obtained English translations of these Korean applications or English Abstracts, then Applicants kindly request that the Examiner forward copies of the same in a supplemental Office Action.

Claim 1 is amended to delete “including no carbon therein”.

Neither KP ‘723 nor KP ‘857 anticipates each and every element of the present invention. Regarding KP ‘723, although the Examiner cites to elements 4,5 in Figures 1a-1c of KP ‘723, Applicants kindly point out at least the structure and structural location of elements 4,5 fail to satisfy the structural element of the present invention requiring “a first metal diffusion barrier layer formed on said first silicon-diffused metal layer and said first insulating interlayer.” Elements 4,5 cannot be “formed on said first silicon-diffused metal layer and said first insulating interlayer” by virtue of at least the location of elements 4,5 *below* any alleged first silicon-diffused metal layer (element 6) within the groove of the first insulating interlayer (3). Elements

4,5 of KP '723 cannot be equated to Applicants' first metal diffusion barrier metal (element 109 in Figure 5I), but instead are more similar to Applicants' barrier metal layer (element 106 in Figure 5I). Thus, elements 4,5 of KP '723 cannot anticipate the specifically claimed metal diffusion barrier layer of the present invention.

Regarding KP '857, the Examiner cites to element 3 in Figures 1a-1c of KP '857, as being equivalent to Applicants' "first insulating interlayer formed on said insulating underlayer, said first insulating interlayer having a groove". Element 3 of KP '857 cannot be equated to Applicants' first insulating interlayer having a groove (element 103 in Figure 5I). Applicants kindly point out that the structure of element 3 of KP '857 fails to have a "groove" as required by the present invention. Thus, element 3 of KP '857 cannot anticipate the specifically claimed first insulating interlayer of the present invention.

Thus, KP '723 and KP '857 fail to anticipate or render obvious each and every element of the present invention as cited by the Examiner.

Accordingly, for at least the foregoing reasons, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 102(b).

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Appln. No. 10/650,193

Atty. Docket No. Q77191

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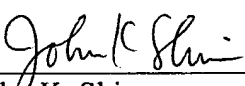
Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

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CUSTOMER NUMBER



John K. Shin
Registration No. 48,409

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